

WHAT IS CLAIMED IS:

1. A method for preparing a coated nickel-base superalloy article that is otherwise susceptible to the formation of a secondary reaction zone, the method comprising the steps of

furnishing a nickel-base superalloy article substrate having thereon an initial aluminum-containing coating comprising an initial-coating additive zone and an initial-coating diffusion zone, the article being susceptible to the formation of the secondary reaction zone if heated to an elevated SRZ reaction temperature for an SRZ reaction period of time; thereafter

removing the initial-coating additive zone and the initial-coating diffusion zone to expose a newly exposed surface that is substantially without cold work and residual stress; and thereafter

depositing a subsequent aluminum-containing coating onto the newly exposed surface of the article substrate, the subsequent aluminum-containing coating including a subsequent-coating additive zone and a subsequent-coating diffusion zone, the article substrate with the subsequent aluminum-containing coating being otherwise susceptible to the formation of the secondary reaction zone if heated to the elevated SRZ reaction temperature for the SRZ reaction period of time.

2. The method of claim 1, wherein the step of furnishing includes the step of

furnishing the nickel-base superalloy article having a rhenium content of not less than about 4.0 percent by weight.

3. The method of claim 1, wherein the step of furnishing includes the step of

furnishing the nickel-base superalloy article made of the alloy René N6, which has a nominal composition in weight percent of about 12.5 percent cobalt, about 4.2 percent chromium, about 1.4 percent molybdenum, about 5.75 percent tungsten, about

5.4 percent rhenium, about 7.2 percent tantalum, about 5.75 percent aluminum, about 0.15 percent hafnium, about 0.05 percent carbon, about 0.004 percent boron, about 0.01 percent yttrium, balance nickel and incidental impurities.

4. The method of claim 1, wherein the step of removing includes the step of removing the initial-coating additive zone and the initial-coating diffusion zone without introducing cold work into the article substrate.

5. The method of claim 1, wherein the step of removing includes the step of removing the initial-coating additive zone and the initial-coating diffusion zone using an acid.

6. The method of claim 1, including an additional step, after the step of removing and before the step of depositing, of stress relieving the article substrate.

7. The method of claim 1, including an additional step, after the step of depositing a subsequent aluminum-containing coating, of heating the article substrate with the subsequent aluminum-containing coating thereon to the SRZ elevated reaction temperature for the SRZ reaction period of time.

8. A method for preparing a coated nickel-base superalloy article that is otherwise susceptible to the formation of a secondary reaction zone, the method comprising the steps of

furnishing a nickel-base superalloy article substrate having thereon an initial aluminum-containing coating comprising an initial-coating additive zone and an initial-coating diffusion zone that are substantially free of platinum and palladium, the article being susceptible to the formation of the secondary reaction zone if heated to an elevated SRZ reaction temperature for an SRZ reaction period of time; thereafter

removing the initial-coating additive zone and the initial-coating diffusion zone;

and thereafter

depositing a subsequent aluminum-containing coating onto the article substrate, the subsequent aluminum-containing coating including a subsequent-coating additive zone and a subsequent-coating diffusion zone that are substantially free of platinum and palladium, the article substrate with the subsequent aluminum-containing coating being otherwise susceptible to the formation of the secondary reaction zone if heated to the elevated SRZ reaction temperature for the SRZ reaction period of time.

9. The method of claim 8, wherein the step of furnishing includes the step of

furnishing the nickel-base superalloy article having a rhenium content of not less than about 4.0 percent by weight.

10. The method of claim 8, wherein the step of furnishing includes the step of

furnishing the nickel-base superalloy article made of the alloy René N6, which has a nominal composition in weight percent of about 12.5 percent cobalt, about 4.2 percent chromium, about 1.4 percent molybdenum, about 5.75 percent tungsten, about 5.4 percent rhenium, about 7.2 percent tantalum, about 5.75 percent aluminum, about 0.15 percent hafnium, about 0.05 percent carbon, about 0.004 percent boron, about 0.01 percent yttrium, balance nickel and incidental impurities.

11. The method of claim 8, wherein the step of removing includes the step of removing the initial-coating additive zone and the initial-coating diffusion zone without introducing cold work into the article substrate.

12. The method of claim 8, wherein the step of removing includes the step of removing the initial-coating additive zone and the initial-coating diffusion zone using an acid.

13. The method of claim 8, including an additional step, after the step of removing and before the step of depositing, of stress relieving the article substrate.

14. The method of claim 8, wherein the step of removing includes the step of removing the initial-coating additive zone and the initial-coating diffusion zone while introducing cold work into the article substrate, and wherein the method includes an additional step, after the step of removing and before the step of depositing, of stress relieving the article substrate.

15. The method of claim 8, including an additional step, after the step of depositing a subsequent aluminum-containing coating, of heating the article substrate with the subsequent aluminum-containing coating thereon to the SRZ elevated reaction temperature for the SRZ reaction period of time.

16. A method for preparing a coated nickel-base superalloy article that is otherwise susceptible to the formation of a secondary reaction zone, the method comprising the steps of

furnishing a nickel-base superalloy article substrate that is susceptible to the formation of the secondary reaction zone if coated with an aluminum-containing layer and heated to an elevated SRZ reaction temperature for an SRZ reaction period of time; thereafter

conditioning the nickel-base superalloy article substrate to be resistant to the formation of secondary reaction zone, the step of conditioning including the step of depositing a conditioning material onto a surface of the article substrate, and thereafter

removing the conditioning material from the article substrate; and thereafter

depositing a subsequent aluminum-containing coating onto the article substrate, the subsequent aluminum-containing coating including a subsequent-coating additive

zone and a subsequent-coating diffusion zone, the article substrate with the subsequent aluminum-containing coating being otherwise susceptible to the formation of the secondary reaction zone if heated to the elevated SRZ reaction temperature for the SRZ reaction period of time.

17. The method of claim 16, wherein the step of depositing the conditioning material includes the step of

depositing an initial aluminum-containing coating comprising an initial-coating additive zone and an initial-coating diffusion zone.

18. The method of claim 16, wherein the step of depositing a conditioning material includes the step of

depositing the conditioning material upon an initial surface of the substrate, and wherein the step of removing the conditioning material includes the step of

exposing a newly exposed surface of the article substrate that is different from the initial surface of the substrate.

19. The method of claim 16, wherein the step of furnishing includes the step of

furnishing the nickel-base superalloy article having a rhenium content of not less than about 4.0 percent by weight.

20. The method of claim 16, wherein the step of furnishing includes the step of

furnishing the nickel-base superalloy article made of the alloy René N6, which has a nominal composition in weight percent of about 12.5 percent cobalt, about 4.2 percent chromium, about 1.4 percent molybdenum, about 5.75 percent tungsten, about 5.4 percent rhenium, about 7.2 percent tantalum, about 5.75 percent aluminum, about 0.15 percent hafnium, about 0.05 percent carbon, about 0.004 percent boron, about 0.01 percent yttrium, balance nickel and incidental impurities.